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Collins

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(54) **TOOL MOUNTING ASSEMBLY**

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(58) **Field of Search** 451/419, 67, 69, 451/73; 157/13; 82/49; 83/914

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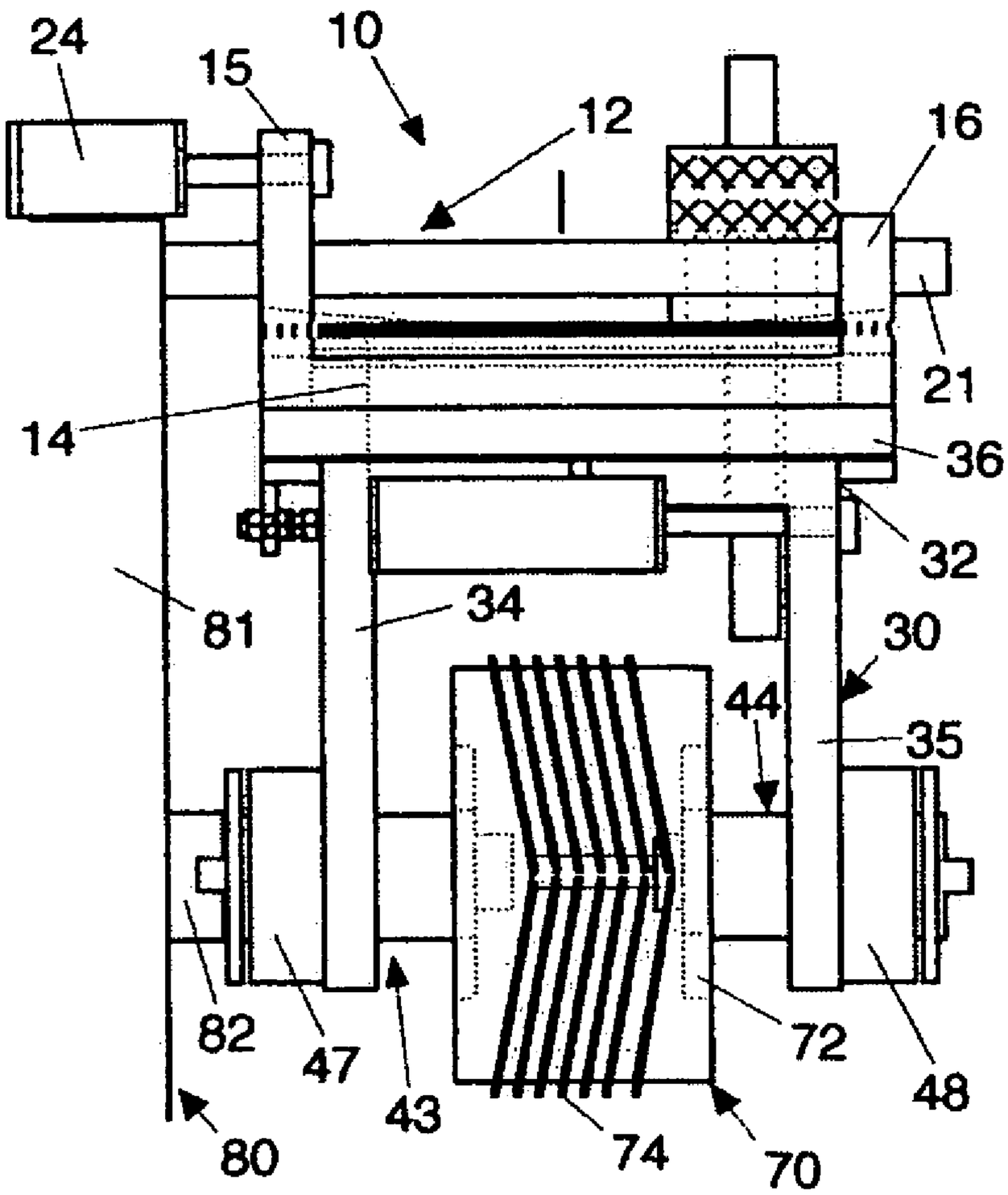
(57) **ABSTRACT**

A tool mounting assembly including a tool support means which includes tool holders adapted for receiving an associated tool and enabling rotation of the associated tool about a rotation axis. The tool mounting assembly further including means for causing relative movement between the tool holders in the direction of the rotation axis so to enable the tool holders to adopt an operative position in which the associated tool is held thereby and the release position in which the associated tool is enabled to be removed from the mounting assembly.

24 Claims, 4 Drawing Sheets



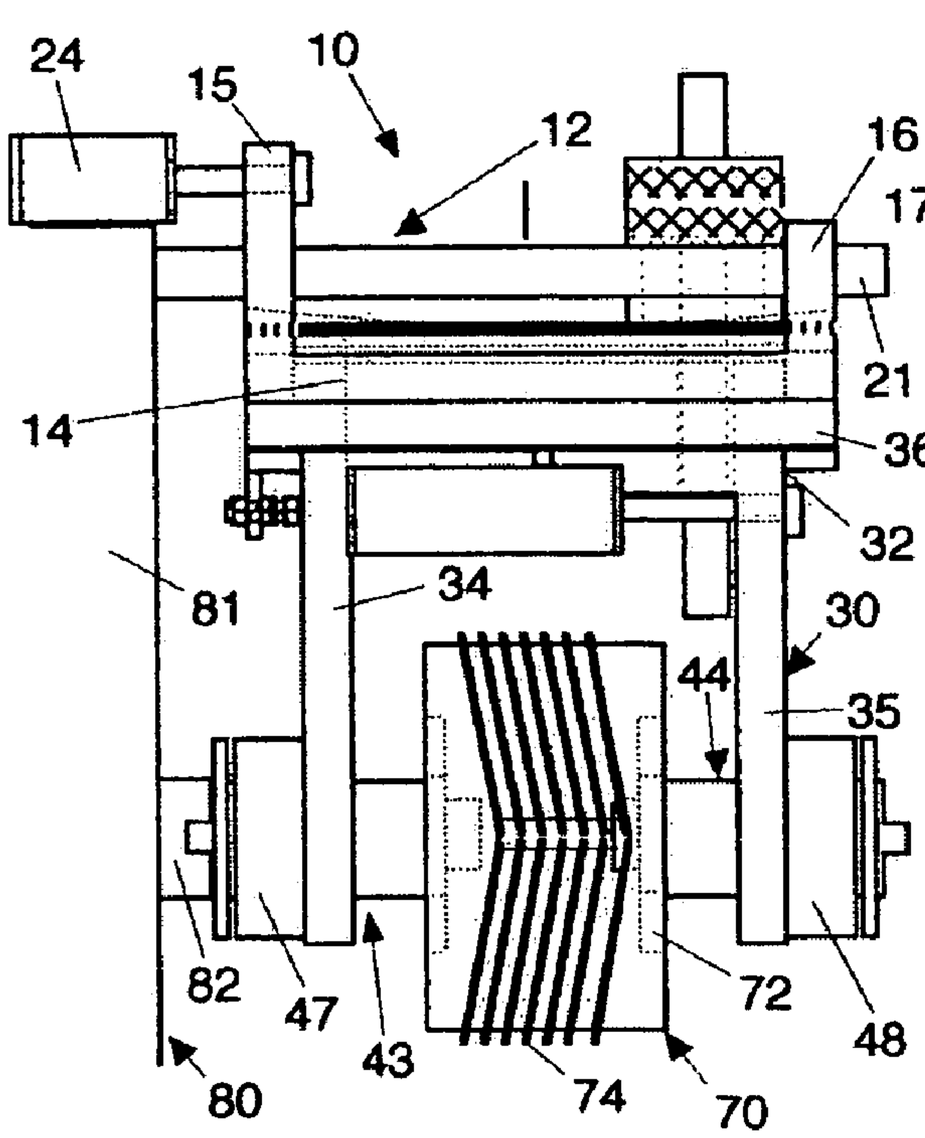


FIG. 1

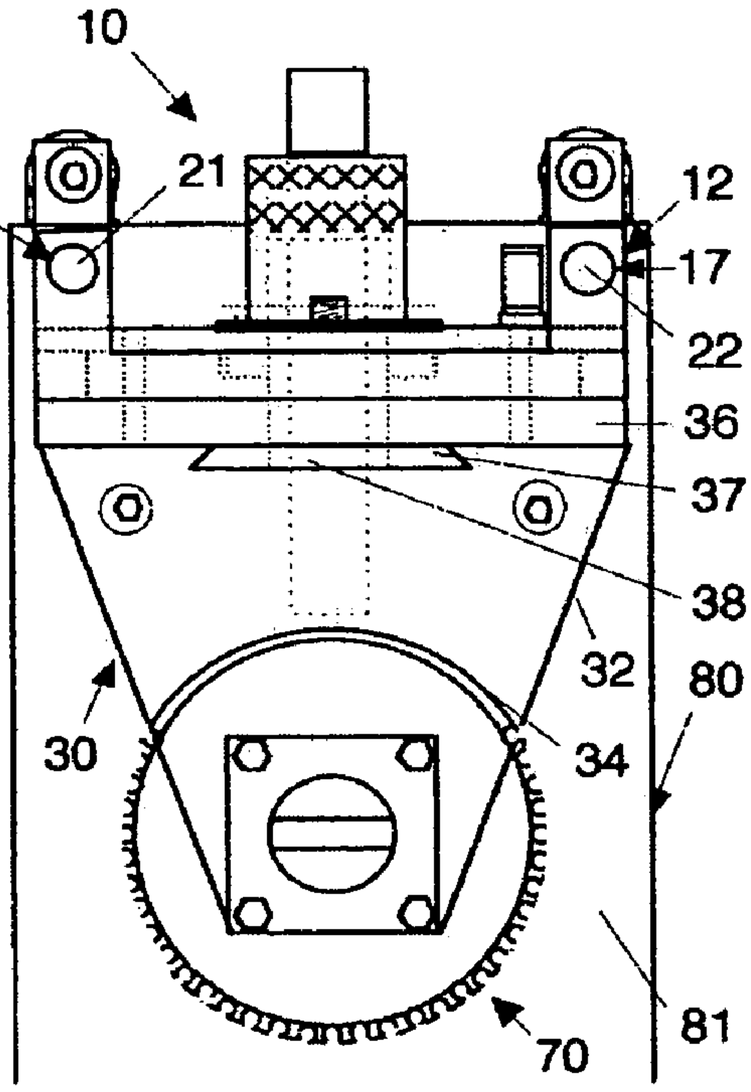


FIG. 2

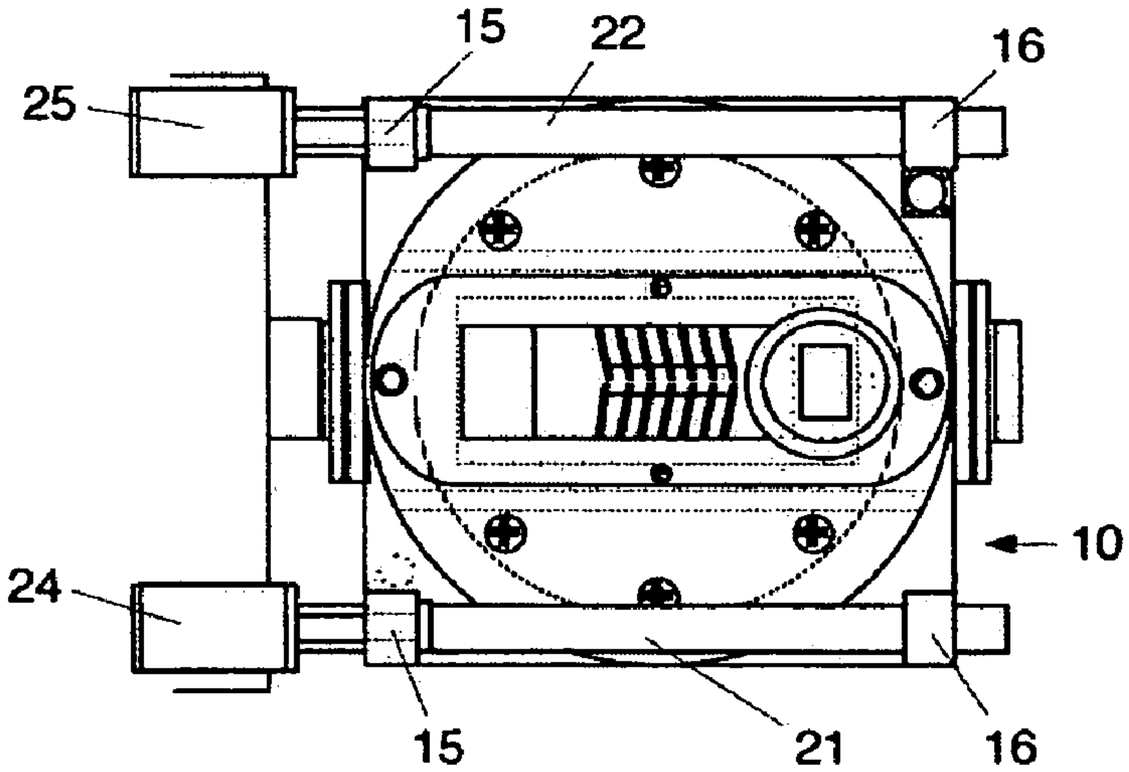


FIG. 3

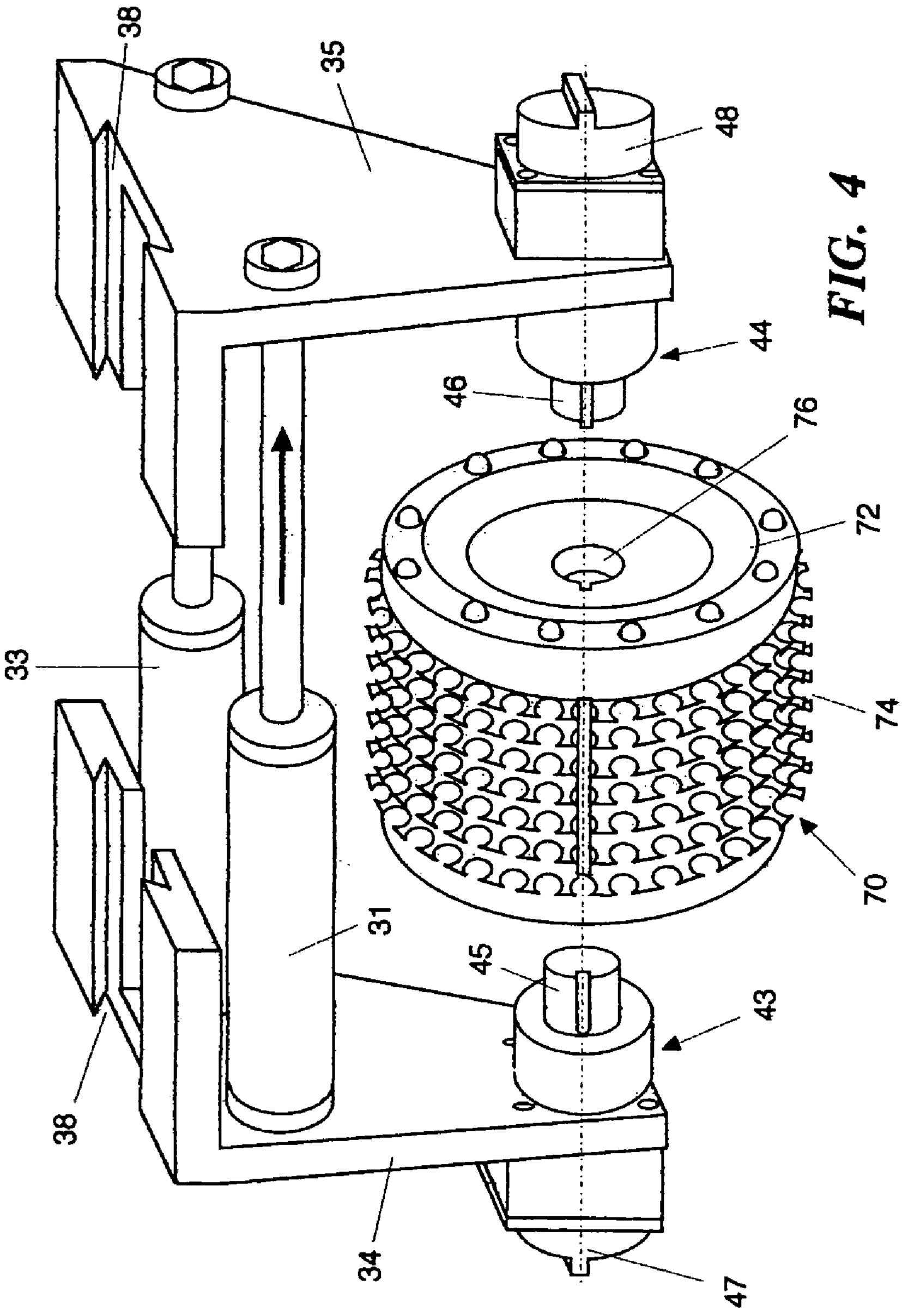


FIG. 4

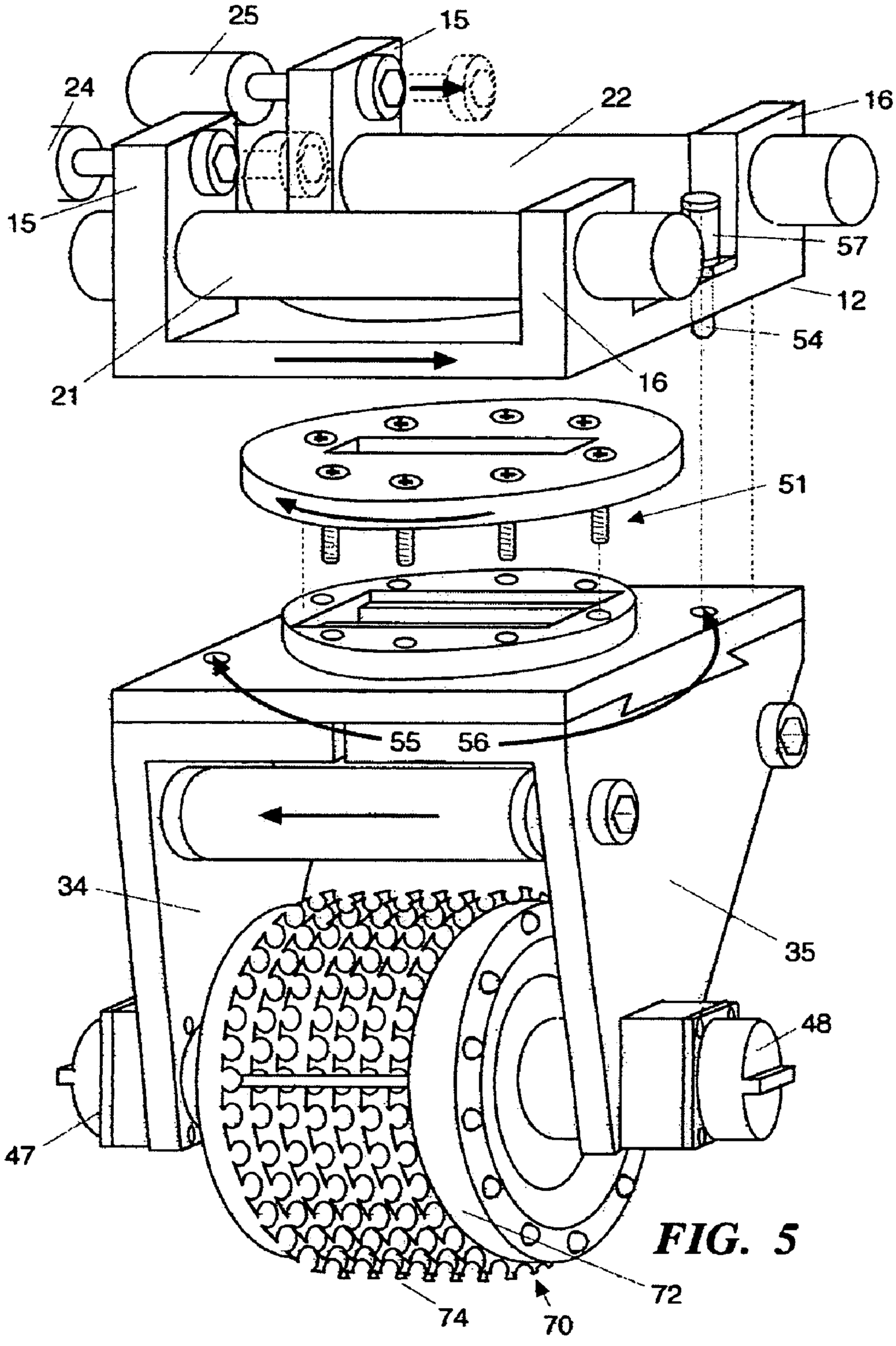


FIG. 5

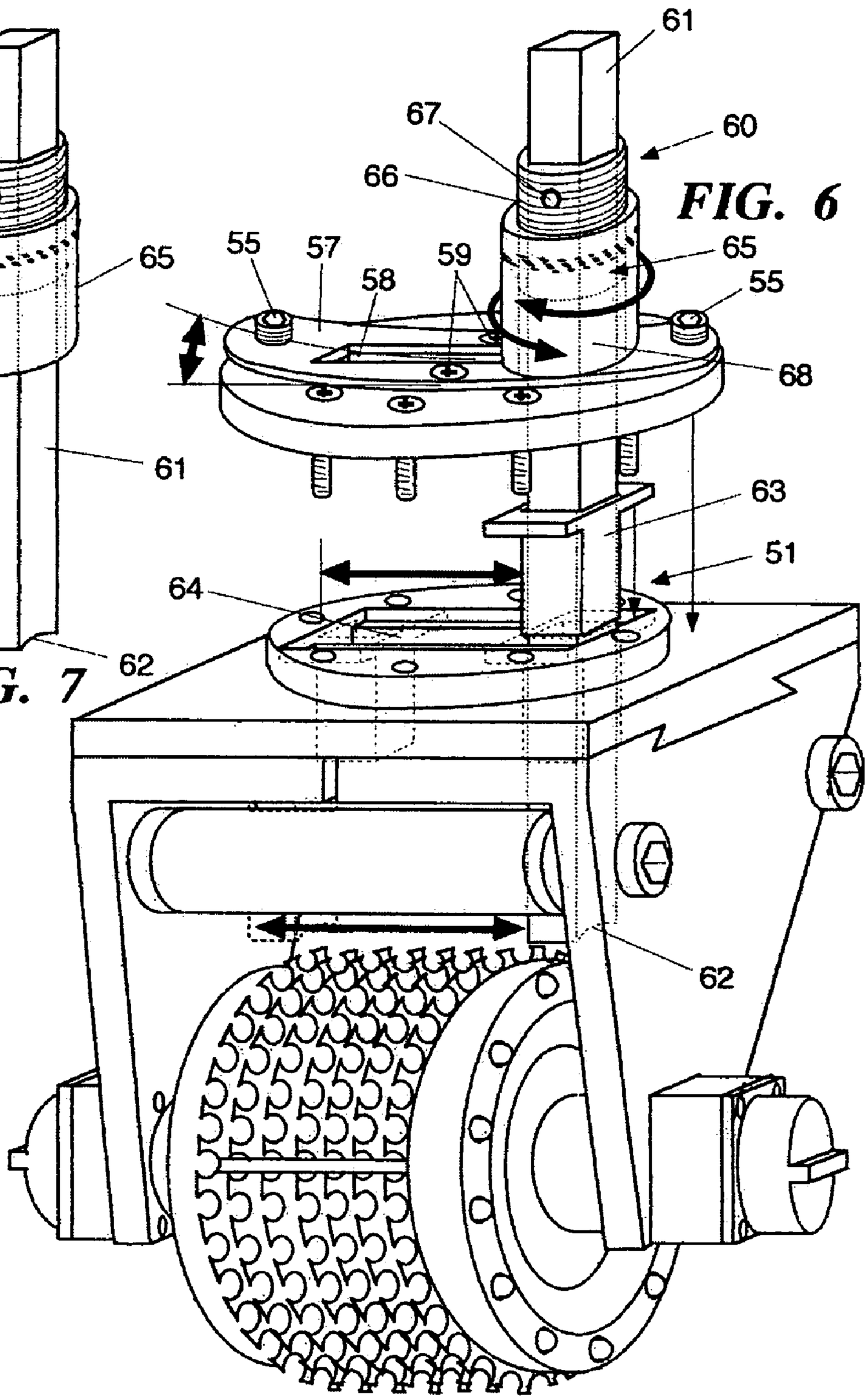


FIG. 7

FIG. 6

TOOL MOUNTING ASSEMBLY

FIELD OF THE INVENTION

This invention relates to a mounting assembly for mounting a tool to a machine.

BACKGROUND OF THE INVENTION

One particular application of the invention is concerned with machines for use in the retreading of tyres. These machines are often referred to as buffing machines and include a tool which removes rubber from the tyre prior to the retreading procedure. The tool maybe in the form of a drum having cutting teeth or blades arranged on the outer surface thereof. The drum is mounted for rotation about its central axis. Such a tool is often referred to as a rasp.

When the rubber is removed from the tyre by the buffing machine the removed rubber may be in the form of long strips, large chunks, medium particles, small crumb size and fine dust. Rubber is very abrasive and as a result the blades on the tool can become blunt very quickly. During the buffing process the blades not only cut into the rubber but also impact with any foreign objects that may be embedded therein. The blades are thin and designed to cut through rubber but not to impact and grind foreign objects such as glass, nails, stones and the like embedded in the surface of the rubber. These objects when dislodged from the tyre are quite dangerous to the operator and it is desired that the objects are directed to an extraction system for drawing the removed rubber and foreign objects away from the operator.

Because of the high wear on the blades, they are designed to be able to cut in both directions of rotation and as such it is necessary to remove the tool from its mounting so that it can be turned so that both sides of the cutting blades can be used. This can be a tedious and time consuming operation.

SUMMARY OF THE INVENTION

There are several distinct and separate aspects to the present invention which as a matter of convenience will hereinafter be described in combination. It is to be understood however this is not to be taken as a limitation as to the scope of the invention in any of its distinct aspects.

According to one aspect of the present invention there is provided a tool mounting assembly for a tool, the assembly including a tool support means which includes tool holders for receiving the tool and enabling rotation of the tool about a rotation axis. The assembly further includes means for causing relative movement between the tool holders in the direction of the axis of rotation so that the tool holders can adopt an operative position in which the tool is held thereby and the release position in which the tool can be removed from the mounting assembly.

In one form the tool support means may include two spaced apart support arms having a tool holder thereon. The support arms being arranged for movement relative to one another between the operative and release positions.

The tool support means a further include a mounting member to which each of the support arms are operatively connected. Preferably one or both of the support arms include a cooperating tongue and groove guide for enabling relative sliding movement between the two parts.

Drive means may be provided for causing the aforementioned relative movement. Such drive means may be in the form of a linear actuator such as a hydraulic piston cylinder assembly. In one form the tool holders may include shafts each being respectively coupled to opposite sides of the tool. One or both of the shafts may be adapted to be operatively connected to drive means so that rotation of the shaft causes rotation of the tool when in the operative position. Preferably keying means is provided between the shafts and the tool.

According to another aspect of the present invention there is provided a tool mounting assembly for a tool, the assembly including a tool support means for supporting the tool for rotation about a rotation axis, a carriage and means for coupling the tool support means to the carriage for rotation relative thereto so that the tool can be rotated about an axis generally at 90° to the axis of rotation.

In one form the assembly includes a turn table which is operatively connected between the tool support means and the carriage for enabling relative rotation therebetween. Releasable locking means may be provided which is movable between a locking position in which the carriage and tool support means are held against relative rotation and an unlocked position. The locking means may include a locking pin on one of the parts which is receivable in an aperture in the other of the parts. The assembly may further include means for moving the carriage laterally.

The tool support means for this aspect of the present invention may be in the form earlier described.

According to yet another aspect of the present invention there is provided a tool mounting assembly for a tool, the assembly including a tool supporting means for support a tool for rotation about a rotation axis, a tool sharpening device operatively connected to the tool support means and including a tool sharpening element which is movable relative to the tool support means and guide means for guiding the tool sharpening element relative to the tool.

In one form the guide means may be adjustable so that the path of traverse can either be linear or curved.

The sharpening element may include an elongated member with the working tip at one end thereof and the guide means include a guide block to which the element is mounted. The guide block being receivable within a cooperating guide slot in the tool support means.

Preferably the sharpening element is axially movable relative to the guide block. To this end an adjustable screw element may be provided for causing the axial movement.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to enable a clearer understanding of the invention, drawings illustrating example embodiments are attached, and in those drawings:

FIG. **1** is a schematic side elevation of apparatus according to a preferred embodiment of the present invention;

FIG. **2** is an end elevation of the apparatus shown in FIG. **1**;

FIG. **3** is a plan view of the apparatus shown in FIGS. **1** and **2**;

FIG. **4** is a detail of part of the apparatus shown in FIGS. **1** to **3**;

FIG. **5** is an exploded view of the apparatus shown in FIGS. **1** to **3** with certain parts not shown for the purpose of clarity;

FIG. **6** is an exploded view of the apparatus shown in FIGS. **1** to **3** with certain parts not shown for the purpose of clarity; and

FIG. **7** is an isometric view of a tool sharpening element shown in FIG. **6**.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to the drawings there is shown a tool mounting assembly generally indicated at **10**, the assembly being adapted to be mounted to a machine **80** having a machine body **81**. The machine **80** includes a motor (not shown) having an output shaft to which a coupling element **82** is operatively connected. The machine shown is in the form of a buffing machine for tyres and the mounting assembly **10** is adapted to receive a tool **70** which is in the form of a rasp having a hub or drum **72** with a series of cutting blades **74** on the outer surface thereof. The hub drum **72** has a keyed mounting aperture **76** therein the purpose of which will hereinafter be described.

The tool mounting assembly **10** includes a carriage **12** which includes a base plate **14** with pairs of upright flanges **15** and **16** at opposite ends of the base plate **14**, the flanges having mounting apertures **17** therein for receiving rails **21** and **22** in the form of rods which in turn are operatively connected to the machine body **81**. The carriage **12** is arranged for sliding movement along the rails **21** and **22** so that the mounting assembly can move towards or away from the machine body **81**. Linear actuators in the form of hydraulic cylinders **24** and **25** are operable to cause movement of the carriage **12** along the rails **21** and **22**.

The tool mounting assembly **10** further includes a tool support section **30** to which the tool **70** is operatively mounted. The tool support section **30** includes a support body **32** including support arms **34** and **35** operatively connected to a coupling plate **36** at least one of which is arranged for sliding movement relative thereto. The connection between the coupling plate **36** and support arms **34** and **35** is via a tongue **37** and groove **38** formed on respective parts. Linear actuators in the form of hydraulic cylinders **31** and **33** cause relative movement between the arms **34** and **35** and coupling plate **36**.

The tool support section **30** further includes tool holders **43** and **44** in the form of stub axles **45** and **46** these stub axles being keyed and receivable within mounting apertures **76** on the tool **70**. Each stub axle **45** and **46** has a coupling element **47** and **48** thereon which are adapted to selectively cooperate with coupling element **82** on the output shaft of the machine.

The tool support section **30** is operatively connected to the carriage **12** by means of a turntable **51** so that under selected circumstances the tool support section **30** can be rotated relative to the carriage **12**. A releasable locking pins **54** on the carriage **12** is selectively receivable within one of apertures **55** or **56** on the tool support section **36** to inhibit relative rotation between the two parts. Pin **54** can be raised or lowered by hydraulic cylinder **57**.

The tool mounting assembly **10** further includes a tool sharpening device **60** including a tool sharpening element **61** having a working tip **62**. The sharpening element **61** is mounted to a guide block **63** which is received within a guide slot **64**. In use the working tip **62** is disposed adjacent to and above the tool. The sharpening element **61** is axially movable relative to the guide block by means of an adjustable screw element **65**. The adjustable screw element **65** includes a threaded member **66** fitted to tool sharpening element by grub screw **67** and a complementary rotatable sleeve **68** which can be manually rotated to cause axial movement of the tool sharpening element **61**.

A tracking guide **57** enables the trip to traverse the tool along a curved path. The tracking guide **57** is in the form of a spring steel plate having a guide slot **58** therein, the plate being connected to part of the turnable **51** via fixing screws **59**. Adjustment screws **55** enable the curvature of the plate to be altered.

The operation of the various parts of the mounting assembly will hereinafter be described.

In the position shown in FIGS. **1** to **3** coupling element **47** of the tool holder **43** is operatively connected to coupling element **82** on the power output shaft. In this coupled position the machine is ready for operation in the normal fashion.

If the tool **70** requires replacement or removal from the machine hydraulic cylinders **31** and **33** are activated causing support arm **35** to move away from support arm **34** thereby enabling release of the tool **70** from stub axles **45** and **46**. The fitting of a tool can be effected in a similar manner.

As mentioned earlier it is the practice to reverse the tool **70** so that the cutting blades can be selectively utilised in both rotational directions of the tool. To perform this operation the hydraulic cylinders **24** and **25** are activated so as to move the carriage **12** and the tool support section **30** away from the machine body **81** thereby disconnecting coupling element **47** from coupling element **82**. The tool **70** is still held by arms **34** and **35**. Activation of hydraulic cylinder **57** causes release of pin **54** from aperture **56**. The tool support section **30** can then be rotated relative to the carriage **12** on turntable **51**. When the tool support section **30** has been rotated 180° the pin **54** is aligned with aperture **55** and hydraulic cylinder **57** activated to move the pin **54** into aperture **55** to lock the two parts together. The hydraulic cylinders **24** and **25** are then activated to return the carriage **12** and support section **30** to the operative position where coupling element **48** engages with coupling element **82**. The machine is again ready for use.

In sharpening operation the curvature of the tracking guide **57** can be adjusted by means of adjustment screws **55** to allow for a parallel or linear or concave or convex traverse. The sleeve is gripped and manually moved across the tool to effect the desired sharpening thereof. As the sharpening tool wears it can be moved downwardly by the adjustable screw member.

Finally, it is to be understood that various alterations, modifications and/or additions may be incorporated into the various constructions and arrangements of parts without departing from the spirit or ambit of the invention.

I claim:

1. A tool mounting assembly, the assembly including a tool support means which includes tool holders adapted for receiving an associated tool and enabling rotation of the associated tool about a rotation axis, the tool mounting assembly further including means for causing relative movement between the tool holders in the direction of the rotation axis so to enable the tool holders to adopt an operative position in which the associated tool is held thereby and the release position in which the associated tool is enabled to be removed from the mounting assembly.

2. A tool mounting assembly according to claim **1** wherein the tool support means includes two spaced apart support arms having a tool holder thereon.

3. A tool mounting assembly according to claim **2** wherein the support arms are arranged for movement relative to one another between the operative and release positions.

4. A tool mounting assembly according to claim **2** wherein the tool support means further includes a mounting member to which each of the support arms are operatively connected.

5. A tool mounting assembly according to claim **2** wherein at least one of the support arms includes a cooperating tongue and groove guide for enabling relative sliding movement between the two arms.

6. A tool mounting assembly according to claim **5** wherein drive means are provided for causing the relative movement.

7. A tool mounting assembly according to claim **6** wherein drive means are in the form of a linear actuator such as a hydraulic piston cylinder assembly.

8. A tool mounting assembly according to claim **1** wherein the tool holders include a plurality of shafts, each shaft being respectively coupled to opposite sides of the tool.

9. A tool mounting assembly according to claim **8** wherein at least one of the shafts is adapted to be operatively connected to drive means so that rotation of the shaft causes rotation of the tool when in the operative position.

10. A tool mounting assembly according to claim **8** wherein keying means is located between the shafts and the tool.

11. A tool mounting assembly, the assembly including a tool support means for supporting the tool for rotation about a rotation axis, a carriage and coupling means for coupling the tool support means to the carriage for rotation relative thereto so to enable that the tool to be rotated about an axis generally at 90° to the axis of rotation, wherein the coupling means includes a turntable which is operatively connected between the tool support means and the carriage for enabling relative rotation therebetween.

12. A tool mounting assembly according to claim **11** further comprise releasable locking means, the releasable locking means being movable between a locking position in which the carriage and tool support means are held against relative rotation and an unlocked position.

13. A tool mounting assembly according to claim **12** wherein the releasable locking means includes a locking pin on one of the parts which is receivable in an aperture in the other of the parts.

14. A tool mounting assembly according to claim **13** wherein the assembly includes means for moving the carriage laterally.

15. A tool mounting assembly according to claim **11** wherein the tool support means includes tool holders for receiving the tool and enabling rotation of the tool about a rotation axis, the tool mounting assembly further including means for causing relative movement between the tool holders in the direction of the rotation axis so to enable tool holders to adopt an operative position in which the tool is held thereby and the release position in which to enable the tool to be removed from the mounting assembly.

16. A tool mounting assembly, the assembly including a tool support means for supporting a tool for rotation about a rotation axis, a tool sharpening device operatively connected to the tool support means and including a tool sharpening element which is movable relative to the tool support means and guide means for guiding the tool sharpening element relative to the tool, the relative movement between tool sharpening element and tool being substantially a traverse in the direction of the axis of rotation.

17. A tool mounting assembly according to claim **16** wherein the guide means is adjustable so that the path of traverse is at least one of linear and curved.

18. A tool mounting assembly according to claim **16** wherein the sharpening element includes an elongated member with a working tip at one end thereof and the guide means include a guide block to which the element is mounted.

19. A tool mounting assembly according to claim **18** wherein the guide block is receivable within a cooperating guide slot in the tool support means.

20. A tool mounting assembly according to claim **16** wherein the sharpening element is axially movable relative to the guide block.

21. A tool mounting assembly according to claim **20** wherein an adjustable screw element is provided for causing the axial movement.

22. A tool mounting assembly according to claim **16** wherein the tool support means includes tool holders for receiving a tool and enabling rotation of a tool about a rotation axis, the tool mounting assembly further including means for causing relative movement between the tool holders in the direction of the rotation axis so to enable the tool holders can adopt an operative position in which a tool is held thereby and the release position in which to enable a tool to be removed from the mounting assembly.

23. A tool mounting assembly according to claim **16** wherein a carriage and coupling means for coupling the tool support means to the carriage for rotation relative thereto are provided, so to enable a tool to be rotated about an axis generally at 90° to the axis of rotation.

24. A tool mounting assembly in accordance with claim **16** wherein a tool support means is provided, the tool support means including tool holders for receiving a tool and enabling rotation of a tool about a rotation axis, the tool mounting assembly further including means for causing relative movement between the tool holders in the direction of the rotation axis so that the tool holders can adopt an operative position in which to enable a tool is held thereby and the release position in which a tool to be removed from the mounting assembly, the tool mounting assembly further including a carriage and coupling means for coupling the tool support means to the carriage for rotation relative thereto so to enable a tool to be rotated about an axis generally at 90° to the axis of rotation.

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